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Revision of the genus *Spinonychiurus* Weiner 1996 (Collembola: Onychiuridae) with description of five new species

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Abstract

The genus *Spinonychiurus* Weiner, 1996 is revised. This genus is assigned to the tribe Thalassaphorurini because of the structure of reduced furca—a small depression in the center of abdominal sternum IV, with 2+2 small posterior chaetae arranged in two rows. *Spinonychiurus* clearly differs from other members of the tribe by the division of abdominal sternum III on two subsegments, each with an own set of chaetae. Five new species, *S. issykkulensis* **sp. nov.**, *S. nazguli* **sp. nov.**, *S. natashae* **sp. nov.**, *S. alaskensis* **sp. nov.** and *S. alabelensis* **sp. nov.** are described. Five previously known species, *S. edinensis* (Bagnall, 1935), *S. spinularius* (Gisin, 1952) **comb. nov.**, *S. subedinensis* (Arbea & Jordana, 1985) **comb. nov.**, *S. tianshanicus* (Martynova, 1971) **comb. nov.** and *S. pamirensis* (Martynova, 1975) **comb. nov.**, are assigned to this genus and redescribed on the basis of the type material and new specimens. An identification key to all known *Spinonychiurus* species is provided.

Key words: springtails, Thalassaphorurini, taxonomy, chaetotaxy, identification key

Introduction

The genus *Spinonychiurus* was erected by Weiner (1996) for *Onychiurus edinensis* Bagnall, 1935 and it was assigned to the tribe Onychiurini (Weiner 1996). As basic and differentiated characters she points out on the structure of furcal remnant and presence of 2+2 spiniform chaetae on abdominal tergum V. Examination of the types of *S. edinensis* confirmed Weiner's taxonomic decision and reveals the presence of other special characters of the genus. The most important and unique character is the division of abdominal sternum III into two subsegments, each with an own set of chaetae. In the description of *Spinonychiurus epaphius* from Ukraine, Kaprus' & Tsalan (2009) have drawn attention to this generic character. This character never has been found within the family Onychiuridae before, but currently it has been discovered by us in four other onychiurid species: *Onychiurus spinularius* Gisin, 1952, *Onychiurus subedinensis* Arbea & Jordana, 1985, *Onychiurus tianshanicus* Martynova, 1971, *Onychiurus pamirensis* Martynova, 1975 and five undescribed species from Central Asia and Alaska. Besides, based on the study of the type specimens of *Onychiurus vandeli* Cassagnau, 1960 from the French Pyrenees Sun *et al.* (2011) also assigned this species to *Spinonychiurus* genus.

The present study contains a new extended diagnosis of the genus *Spinonychiurus*, redescription of mentioned above five species and description of five new species. An identification key to all known *Spinonychiurus* species is also provided.

The nomenclature of morphological details used in description has been adopted after Weiner (1996), Pomorski (1998) and Fjellberg (1999).

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Key to Holarctic *Spinonychiurus* species

1 Anal spines absent, pseudocellar formula dorsally: 5–6 5/4–5 8 8–10/9–13 9–12 9–14 9–14 7–10 . . . . . *S. epaphius* Kaprus' & Tsalan, 2009
- Anal spines present 2
2 Antennal III sensory organ with granulated sensory clubs 3
- Antennal III sensory organ with smooth sensory clubs 4
3 Pseudocellar formula dorsally: 34/233/44454. . . . . *S. pamirensis* (Martynova, 1975)
- Pseudocellar formula dorsally: 32/233/33343. . . . . *S. vandeli* (Cassagnau, 1960)
4 Distal whorl of tibiotarsi with 11 chaetae 5
- Distal whorl of tibiotarsi with 7 or 9 chaetae 10
6 Abdominal tergum V with 2+2 spiniform chaetae in the position of p1 and p2 (Fig. 6) 7
- Abdominal tergum V without spiniform chaetae 8
7 Empodial appendage 0.7–0.75 length of inner edge of claw (Fig. 5), anal spines 1.3 times as long as inner edge of claw III, subcoxae1 of I–III legs with 3,4,4 chaetae respectively . . . . . *S. edinensis* (Bagnall, 1935)
- Empodial appendage 0.4–0. 5 length of inner edge of claw (Fig. 11), anal spines 1.5–1.6 times as long as inner edge of claw III, subcoxae1 of I–III legs with 4–5,5,5 chaetae respectively . . . . . *S. spinularius* (Gisin, 1952)
8 Thoracic terga II and III with 1+1 anterolateral pseudocelli, abdominal terga I–IV with multiple pseudocelli, more than 5+5 on each segment (pseudocellar formula dorsally: 34/244/5-67694 as in Fig. 65) . . . . . *S. arabelensis* **sp. nov.**
- Thoracic terga II and III without anterolateral pseudocelli, abdominal terga I–IV with not more than 5+5 pseudocelli on each segment 9
9 Empodial appendage with basal lamella (Fig. 18), body sensory chaetae s well differentiated, abdominal sternum IV without pseudocelli (Fig. 20) . . . . . *S. subedinensis* (Jordana & Arbea, 1985)
- Empodial appendage without basal lamella (Figs. 25), body sensory chaetae s invisible, abdominal sternum IV with 1+1 pseudocellus (Fig. 26) . . . . . *S. tianshanicus* (Martynova, 1971)
10 Distal whorl of tibiotarsi with 7 chaetae, ventral tube with 4+4 chaetae at base, pseudocellar formula dorsally: 32/122/33343 (Figs 58, 64) . . . . . *S. alaskensis* **sp. nov.**
- Distal whorl of tibiotarsi with 9 chaetae 11
11 Thoracic tergum I with 1+1 pseudocellus, abdominal sternum IV with 1+1 pseudocelli, labial palp of A type (pseudocellar formula dorsally: 33/133/33343 as in Fig. 44) . . . . . *S. nazguli* **sp. nov.**
- Thoracic tergum I with 2+2 pseudocellus, abdominal sternum IV with 2+2 parapseudocelli, labial palp of AB type 12
12 Pseudocellar formula dorsally 43/233/44454 (Fig. 36). . . . . *S. issykkulensis* **sp. nov.**
- Pseudocellar formula dorsally 33/233/33353 (Fig. 57) . . . . . *S. natashe* **sp. nov.**

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